



# MODULAR CONCEPTS CUSTOMER-SPECIFIC SOLUTIONS TECHNOLOGICAL LEADERSHIP



#### **DESIGN AND STYLING**

Lighting plays a central role in characterising a vehicle's appearance. For this reason, styling is particularly important during the development process. Hella meets these challenges with different technologies that guarantee maximum design freedom for the manufacturer. In addition, industrial design specialists are working throughout the company group to provide customers with optimum support in all processes. A customer specific Corporate Identity can be built up and consolidated using innovative Hella technologies. Styling as one of Hella's main areas of expertise makes a contribution to sharpening the OE brand image.

#### ON SITE HELLA SUPPORT

We do not only use ourselves as topquality supplier, but rather as development partner. If required, our developers and engineers can work with your teams on site to prepare optimum solutions. This speeds up processes and prepares the way of new standards. More technological freedom, more styling freedom, more room for rationalization. That is Hella.

#### FROM THE DESIGN TO THE PERFECT HEADLAMP – SUMMARY OF OUR SERVICE

Always cutting-edge technology, highly qualified employees and flexible solutions – this is how we present ourselves as experts for all kinds of lighting. We are available for classic and customized requirements, from standard headlamps to demanding special custom products.

We offer a complete chain of customer-oriented services in advanced lighting technology:

- Research & Development
- Mechanical design
- Optical design
- Simulation
- Own sample manufacturing
- Test laboratory
- Lighting laboratory
- Tool design
- Tool construction
- Plastic molding injection
- Surface finishing
- Assembly







The latest LED developments are already so advanced that they beat Xenon light performance. LEDs also deliver high colour temperatures of approx. 6,000° Kelvin, providing illumination comparable to daylight. Driving under these light conditions protects your eyes and keeps you alert for longer.

#### **ADVANTAGES OF LED LIGHTS**

- High light output
- Low power consumption
- Maintenance-free
- Extremely long service life
- 100% water- and dust-proof
- High resistance to vibration
- Low temperature on the lens
- Rapid response times
- Colour temperature comparable to daylight
- New scope for design

#### ALL THE ADVANTAGES OF MODERN LED LIGHTING TECHNOLOGY ARE OPTIMALLY EMPLOYED IN HELLA LIGHTS.

The choice of LEDs, the power supply and thermal management are key factors in achieving optimum light output (lumen). The quality of the components used by HELLA ensures, for example, that the light remains at the same level of brightness at high ambient temperatures. Good thermal management is necessary to ensure the long service life and the cost-effectiveness of an LED lighting product. The reason for this is that as soon as an LED is illuminated, heat is produced. The more current that is supplied to the system, the more heat

is produced by the LED. The higher the LED temperature, the lower the light output and the shorter the service life. The heat must therefore be dissipated into the environment. HELLA uses the latest simulation programs during product development to ensure optimal heat dissipation.

# Glossary of the most important lighting terms



#### **LUMINOUS INTENSITY**

Unit of measurement: candela [cd]

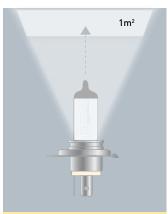
Generally speaking, a light source emits its luminous flux in different directions and at different intensities. The visible radiant intensity in a particular direction is called luminous intensity.



#### **LUMINOUS FLUX**

Unit of measurement: lumen [lm]

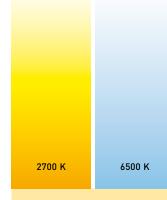
All the radiated power emitted by a light source and perceived by the eye is called luminous flux.



#### ILLUMINANCE

Unit of measurement: lux [lx]

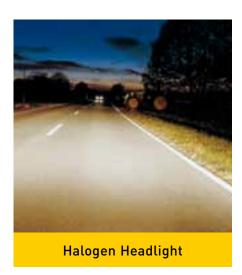
Illuminance is the ratio between the luminous flux and the area to be illuminated. An illuminance of 1 lx occurs when a luminous flux of 1 lm is evenly distributed over an area of 1 m<sup>2</sup>.

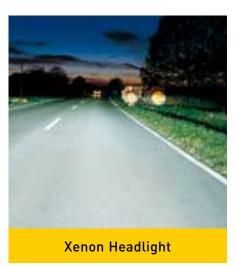


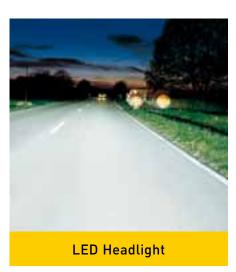
#### COLOUR TEMPERATURE

Unit of measurement: Kelvin [K]

The colour temperature of a light source is defined in comparison with a "black body radiator. The higher the temperature of this "black body radiator" the greater the blue component in the spectrum and the smaller the red component.







Halogen 3000 K Xenon **4150 K** 

LED **6000 K** 

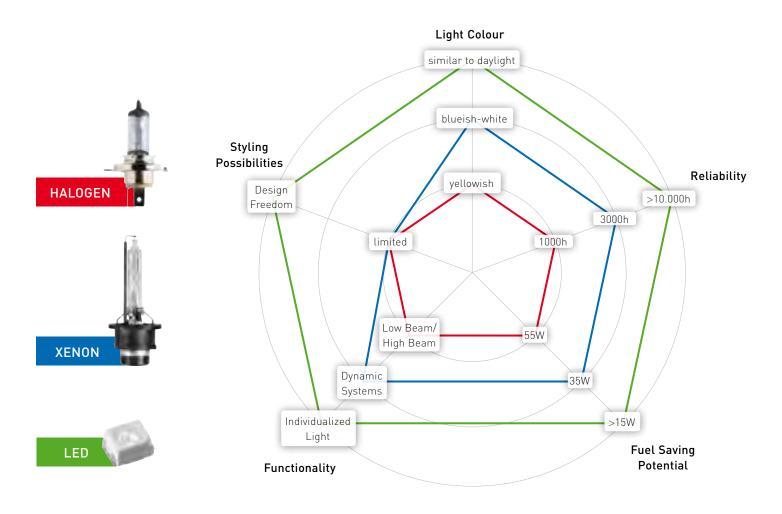
Candlelight 1500 K Light bulb 2700 K

Fluorescent Lamp (cool white) **4500 K** 

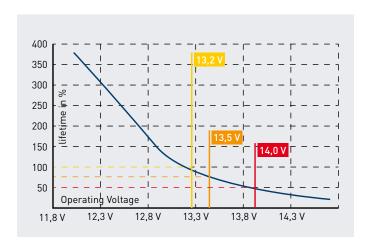
Daylight 6500 K



# Comparison of LED & conventional Light Sources



# Dependency of bulb lifetime & operating voltage



The service life and the light output depend to a large extent on the existing supply voltage among other factors.

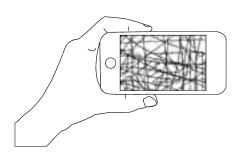
As a rule of thumb it can be said: If the supply voltage of a light is increased by 5 % the luminous flux increases by 20% but at the same the service life is cut by half.

# **IP Ratings**

How well protected is a product against environmental influences? The IP protection class states how resistant the product is. The classes are defined in DIN 40 050 Part 9. HELLA products are designed for different degrees of protection:

First Digit	PROTECTION AGAINST SOLID FOREIGN OBJECTS AND ACCESS TO HAZARDOUS PARTS		
0			Non-protected
1		50mm	Protected against solid foreign objects of 50mm diameter and greater
2		12mm ↓ ↑	Protected against solid foreign objects of 12.5mm diameter and greater
3		2.5mm ↓ ↑	Protected against solid foreign objects of 2.5mm diameter and greater
4		1.0mm ↓ ↑	Protected against solid foreign objects of 1.0mm diameter and greater
5			Dust-protected
6			Dust-sealed

Second Digit	PROTECTION AGAINST LIQUIDS		
0		Non-protected	
1		Protected against drops of water falling vertically	
2		Protected against drops of water falling vertically at up to 15° from the vertical	
3		Protected against spraying water falling vertically at up to 60° from the vertical	
4		Protected against splas- hing water from all directions	
4K		With higher pressure	
5		Protected against jet of water from all directions	
6		Protected against jet of water similar force to seas	
6K		With higher pressure, specific for road vehicles	
7	1 m	Protected against the effects of immersion Protected against high pressure cleaner, specific for road vehicles	
8	1 m V	Protected against prolon- ged effects of immersion under pressure to speci- fied depth	
9K		Protected against high pressure cleaner, specific for road vehicles	







HN 67101		CL 13.1 - Motorcycles
	Vibration fatigue limit	Test in compliance with SAE J 575 $f^2$ - extended test duration 4h; test according to HN 67013-07 <sup>2</sup> ;
MECHANICAL	Resistance to mechanical impact	Surface-mounted headlamp must withstand pendulum impact from the side with 10 J without damage Test according to HN 67015-03
REQUIREMENTS	Resistance to mechanical shock	Test according to HN 67013-09 (40 g, 50 semi-sine shaped shocks per spatial axis, duration 6 ms)
	Resistance to free fall	Headlamp must endure fall test from a height of 30 cm on 6 sides without concealed damage Test according to HN 67015-01
	Resistance to temperature change, device out of operation	2 h at +80 °C + 2 h at -40 °C test according to HN 67011-03 48 h at +65 °C + 2 h at -40 °C test according to HN 67011-03 2 h at +90 °C + 2 h at -40 °C, test according to HN 67011-03
	Heat resistance in operating state	1 h at 50 °C; headlamp in addition for 48 h at +23 °C in calm air. With PCL³ in addition 1 h with lens soiled to 80% Test according to HN 67009-02 or in compliance with SAE J 575², test according to HN 67009-06²
	Resistance to fogging with ventilated devices	Test according to HN 67017-02, rain track test according to HN 67007-07
	Resistance to cyclic humidity/heat	According to DIN EN 60068-2-30, upper temperature = $+55$ °C, number of cycles 2, devices with electronics 6 cycles - device in cyclical function
CLIMATIC	Air-tightness on ventilated devices	Excess air pressure test according to HN 67010-03
REQUIREMENTS	Air-tightness on pressure-sealed devices	Temperature alternating bath test according to HN 67010-02; excess air pressure test according to HN 67010-01
	Protection against the penetration of solid particles including dust	Protective rating IP5KX - DIN 40050-9 or in compliance with SAE J5752; with dustproof devices deviating protective rating IP6KX
	Protection against water	Splashwater test according to HN 67007-01, high-pressure cleaner test according to DIN 40050-9 (IPX9K) and HN 67007-02 if necessary, air-tightness test with fluids containing tensides according to HN 67007-06; sludge deposit test according to HN 67007-05
	Resistance to temperature shock	After 15 min operation in calm air, immersion in water at +20 °C, test according to HN $67012-03$
	Immunity to reagents	ISO 16750-5:2003 Annex A, identifications: F, L, P, Y
	Adherence resistance of the coating	Test acc. to DIN EN ISO 2409 - Requirement: Gt 1 to 2
CHEMICAL	Corrosion resistance Salt spray test (SS) <sup>1</sup>	Test 96 h SS - DIN EN ISO 9227
REQUIREMENTS	Condensation constant climate (CC) <sup>1</sup> device in operation	Test according to DIN EN ISO 6270-2 - 48 h - KK
	Modified Corrodkote method <sup>1</sup>	Test according to DIN EN ISO 4541 - 5 cycles (only for chrome-plated decorative surfaces)
	Passive electronics <sup>4</sup>	The electrical requirements have to be tested according to ISO 16750-2, section 4.1, 4.2, 4.6, 4.9 and 4.10. Deviating from section 4.9, however, the dielectric strength must be tested at a testing voltage of 1000 Veff.
ELECTRONIC REQUIREMENTS	Active electronics <sup>5</sup>	The electrical requirements must be checked according to ISO 16750-2. Deviating from section 4.9, however, the dielectric strength must be tested at a testing voltage of 1000 Veff.
	Evaluation of electrolytic reactions	This test must be carried out on devices that could become damaged by fluid penetration during everyday application conditions. Open housing: manual salt spray test; closed housing: monitoring of function when salt solution penetrates.

After the tests the functioning of the devices must be ensured (still excluding assessments of electrolytic reactions and burning behavior).

No base metal corrosion, no blistering, creepage WB according to DIN EN ISO 7253 max. 2.5 mm. (Changes of the coating in cases in which it reacts with the test medium, such as zinc, for example, are allowed with SO2 and microcrack chromium.)

<sup>&</sup>lt;sup>2</sup> Applies only to U.S. devices

<sup>3</sup> KSS = cover lens

<sup>4</sup> Lamps with passive electronics contain only passive components such as resistors, capacitors, diodes, LEDs, etc. The electronic circuits are relatively straightforward.

Eamps with active electronics contain, in addition to passive and active components, such as transistors, integrated circuits, micro controllers etc.. The electronic circuits are relatively complex. These tests omitted if the built-in electronics unit consists exclusively of Type-tested sub-assemblies and the climatic and mechanical environments are identical.

# **CL 13.2 - ATV**

HN 67013-13, vertical and horizontal: 9.6 g / 7 h and HN 67013-07<sup>2</sup>

Surface-mounted headlamp must withstand pendulum impact from the side with 10 J without damage Test according to HN 67015-03

Surface-mounted headlamp must withstand pendulum impact from the side with 10 J without damage Test according to HN 67015-03

Headlamp must endure fall test from a height of 30 cm on 6 sides without concealed damage Test according to HN 67015-01

2 h at +80 °C + 2 h at -40 °C test according to HN 67011-03 48 h at +65 °C + 2 h at -40 °C test according to HN 67011-03 2 h at +90 °C + 2 h at -40 °C, test according to HN 67011-03

1 h at 50 °C; headlamp in addition for 48 h at +23 °C in calm air. With PCL³ in addition 1 h with lens soiled to 80% Test according to HN 67009-02 or in compliance with SAE J  $575^2$ , test according to HN 67009-06²

Test according to HN 67017-02, rain track test according to HN 67007-07

According to DIN EN 60068-2-30, upper temperature = +55 °C, number of cycles 2, devices with electronics 6 cycles - device in cyclical function

Excess air pressure test according to HN 67010-03

Temperature alternating bath test according to HN 67010-02; excess air pressure test according to HN 67010-01

Protective rating IP5KX - DIN 40050-9 or in compliance with SAE J575 $^{\circ}$ ; with dustproof devices deviating protective rating IP6KX

Splashwater test according to HN 67007-01, high-pressure cleaner test according to DIN 40050-9 (IPX9K) and HN 67007-02 if necessary, air-tightness test with fluids containing tensides according to HN 67007-06; sludge deposit test according to HN 67007-05

After 15 min operation in calm air, immersion in water at +20  $^{\circ}$ C, test according to HN 67012-03

ISO 16750-5:2003 Annex A, identifications: F, L, P, Y

Test acc. to DIN EN ISO 2409 - Requirement: Gt 1 to 2

Test 144 h SS - DIN EN ISO 9227 (extended test)

Test according to DIN EN ISO 6270-2 - 48 h - KK

Test according to DIN EN ISO 4541 - 1 cycle (only for chrome-plated decorative surfaces)

The electrical requirements have to be tested according to ISO 16750-2, section 4.1, 4.2, 4.6, 4.9 and 4.10. Deviating from section 4.9, however, the dielectric strength must be tested at a testing voltage of 1000 Veff.

The electrical requirements must be checked according to ISO 16750-2. Deviating from section 4.9, however, the dielectric strength must be tested at a testing voltage of 1000 Veff.

This test must be carried out on devices that could become damaged by fluid penetration during everyday application conditions. Open housing: manual salt spray test; closed housing: monitoring of function when salt solution penetrates.

# CL 13.3 - Snowmobiles

Broadband noise 0,1 g/HZ, test according HN 67013-03 respectively in compliance with SAE J 575², Test according HN 67013-04²

Surface-mounted headlamp must with stand pendulum impact from the side with 10 J without damage Test according to  $\mbox{HN}$  67015-03

Test according to HN 67013-09 (40 g, 50 semi-sine shaped shocks per spatial axis, duration 6 ms)

Headlamp must endure fall test from a height of 30 cm on 6 sides without concealed damage Test according to HN 67015-01

2 h at +80 °C + 2 h at -40 °C test according to HN 67011-03 48 h at +65 °C + 2 h at -40 °C test according to HN 67011-03 2 h at +90 °C + 2 h at -40 °C, test according to HN 67011-03

1 h at 50 °C; headlamp in addition for 48 h at +23 °C in calm air. With PCL³ in addition 1 h with lens soiled to 80% Test according to HN 67009-02 or in compliance with SAE J 575², test according to HN 67009-06²

Test according to HN 67017-02, rain track test according to HN 67007-07

According to DIN EN 60068-2-30, upper temperature = +55 °C, number of cycles 2, devices with electronics 6 cycles - device in cyclical function

Excess air pressure test according to HN 67010-03

Temperature alternating bath test according to HN 67010-02; excess air pressure test according to HN 67010-01

Protective rating IP5KX - DIN 40050-9 or in compliance with SAE J575 $^{\circ}$ ; with dustproof devices deviating protective rating IP6KX

Splashwater test according to HN 67007-01, high-pressure cleaner test according to DIN 40050-9 (IPX9K) and HN 67007-02 if necessary, airtightness test with fluids containing tensides according to HN 67007-06;

After 15 min operation in calm air, immersion in water at +20 °C, test according to HN 67012-03  $\,$ 

ISO 16750-5:2003 Annex A, identifications: F, L, P, Y

Test acc. to DIN EN ISO 2409 - Requirement: Gt 1 to 2

Test 144 h SS - DIN EN ISO 9227 (extended test)

Test according to DIN EN ISO 6270-2 - 48 h - KK

Test according to DIN EN ISO 4541 - 1 cycle (only for chrome-plated decorative surfaces)

The electrical requirements have to be tested according to ISO 16750-2, section 4.1, 4.2, 4.6, 4.9 and 4.10. Deviating from section 4.9, however, the dielectric strength must be tested at a testing voltage of 1000 Veff.

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This test must be carried out on devices that could become damaged by fluid penetration during everyday application conditions. Open housing: manual salt spray test; closed housing: monitoring of function when salt solution penetrates.

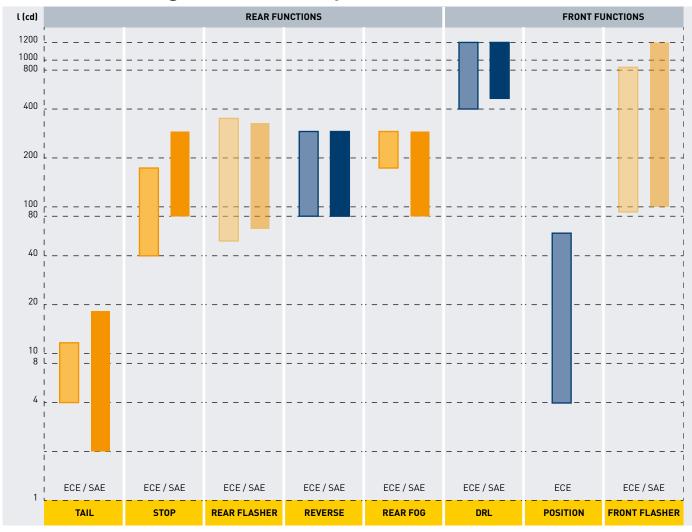


# Most important legal demands

		EU MARKET	US MARKET		
Function		ECE	Motorcycle	ATV	Snowmobile
	Regulation	R50	FMVSS108	SAE J585	SAE J279
	Lighting surface	not defined	min. 50cm²	min. 13cm² at 45°	min. 13cm² at 45°
TAIL	Luminous intensity	HV: 4cd - 12cd Visible area: H: +/- 80°,V: +15/-10° mind. 0,05cd	HV: 2cd - 18cd Visible area: H: +/- 80°,V: +15/-15° mind. 0,05cd	HV: 2cd - 18cd Visible area: H: +/- 45°,V: +15/-15° mind. 0,05cd	HV: 2cd - 18cd Visible area: H: +/- 45°,V: +15/-15° mind. 0,05cd
	<b>5</b>	250	E1 11/20400	0.15.1507	0.15.1050
	Regulation	R50	FMVSS108	SAE J586	SAE J278
STOP	Lighting surface	not defined	min. 50cm²	min. 37,5cm <sup>2</sup>	min. 13cm² at 45°
STOP	Luminous intensity	HV: 40cd - 185cd Visible area: H: +/- 45°, V: +15/-10° mind. 0,3cd	HV: 80cd - 300cd Visible area: H: +/- 45°,V: +15/-10° mind. 0,3cd	HV: 80cd - 300cd Visible area: H: +/- 45°,V: +15/-10° mind. 0,3cd	HV: 40cd - 100cd Visible area: H: +/- 45°,V: +15/-10° mind. 0,3cd
	<b>-</b>	D50	E1 11/20400	0.15.1500	
	Regulation	R50 - category 12	FMVSS108	SAE J588	
FLASHER	Lighting surface	not defined	min. 22,6cm <sup>2</sup>	min. 22,6cm <sup>2</sup> / min. 37,5cm <sup>2</sup>	
REAR	Luminous intensity	HV: 50cd - 350cd Visible area: H: 20° inside/ 80 degree outside, V: +15/-15° mind. 0,3cd	HV: 65cd - 325cd Visible area: H: 20° inside/ 80 degree outside, V: +15/-15° mind. 0,3cd	HV: min. 130cd Visible area: H: 45° inside/ 80 degree outside, V: +15/-15° mind. 0,3cd	not requested
	B 1.:	DE0	EN 11/00/100	CAE 1500	
	Regulation	R50 - category 11	FMVSS108	SAE J588	
FLACUED	Lighting surface	not defined	min. 22,6cm <sup>2</sup>	min. 37,5cm <sup>2</sup>	
FLASHER FRONT	Luminous intensity	HV: 90400 - 700860cd*) Visible area: H: 20 ° inside/ 80° outside, V: +15/-15° mind. 0,3cd	HV: min. 100250cd *) Visible area: H: 20 ° inside/ 80° outside, V: +15/-15°mind. 0,3cd	HV: min. 200500cd *) Visible area: H: 45 ° inside/ 80° outside, V: +15/-15° mind. 0,3cd	not requested
	*) depends on the distance to the head	dlamp unit			
	Regulation	R50			
POSITION LIGHT	Luminous intensity	HV: 4cd - 60cd (separately), to 100cd (assembled with headlamp function) Visible area: H: +/- 80°, V: +15/-10° mind. 0,05cd	not requested		
			FMVSS108 -		
REVERSE	Regulation	R23	SAE J583c	not requested	not requested
LIGHT	Luminous intensity	HV: 80cd - 300cd	HV: 80cd - 300cd	·	· ·
			ENVICE 100		
DAYTIME	Regulation	R87	FMVSS108 - SAE J2087		
RUNNING LIGHT	Lighting surface	min. 25cm²	min. 25cm <sup>2</sup> and min. 10cm <sup>2</sup> at 45°	not requested	not requested
	Luminous intensity	HV: 400cd - 1200cd	HV: 500cd - 1200cd		
1.004		ECE-R113 class B,D,E	FMVSS108 - Tab.32	FMVSS108 - Tab.32	SAE J280
LOW BEAM	Regulation	ECE-R113 class B,D,E	SAE J 584 APR1964	SAE J 584 APR1964	JAL J200
JEAN		LOL-IVITZ Class A,D	JAL J 304 AFR 1704	JAL J J04 AFR 1704	
HIGH		ECE-R113 class B,D,E	FMVSS108 - Tab.32	FMVSS108 - Tab.32	SAE J280
BEAM	Regulation	ECE-R112 class A,B	SAE J 584 APR1964	SAE J 584 APR1964	

Remark 1: For every law area it is possible to use a higher category of illumination units like as for passenger cars in US or vehicle class M and N in Europe Remark 2: The installing and mounting of the lighting equipment is regulated for US in FMVSS108 (Motorcycle dot) and SAE J 1623 (ATV's) Remark 3: The installing and mounting of the lighting epipment is regulated for Europe in regulation 2009/67/EU and respectively ECE-regulation 53

# Overview light intensity















High beam





#### MODULE 60

Integrated headlamp with HB3 bulb, reflector made of aluminium cast, light egress Ø 60 mm

Low beam headlamp, right-side traffic, ECE/SAE	1BL 998 570-001
Low beam headlamp, left-side traffic, ECE	1BL 998 570-011
Low beam headlamp, symmetrical light distribution, ECE/SAE	1KL 998 570-331
High beam headlamp without position light, ECE/SAE	1KL 998 570-021
High beam headlamp with position light, ECE/SAE	1KL 998 570-031







#### PS 95

Integrated headlamp with H11 bulb, plastic reflector with pattern - free glass lens

Low beam headlamp, symmetrical light distribution, ECE/SAE	1T0 998 583-007
High beam headlamp with position light, ECE/SAE	1K0 998 583-017
High beam headlamp without position light, ECE/SAE	1K0 998 583-027









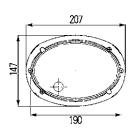
#### M 133

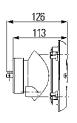
Integrated headlamp with H4 bulb and pattern-free glass lens, with position light, symmetrical light distribution, light egress  $\emptyset$  135 mm

Low and high beam, ECE/SAE

1A3 996 262-037







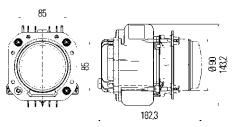
#### **OVAL 120**

Integrated headlamp with HB2 bulb, inclination adjustable through  $4^{\rm o}\textsc{,}$  asymmatrical light distribution

With position light	1AB 996 157-091
Without position light	1AB 996 157-081





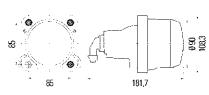


#### **MONO AND BI-LED**

Maintenance-free module for normally more than 15,000 operating hours, very homogenous light and rapid start time, 35 watt power consumption, no movable parts, passive cooling system

Mono LED, right-side traffic, ECE	1BL 010 820-001
Mono LED, left-side traffic, ECE	1ML 010 820-011
Bi-LED, right-side traffic, ECE	1AL 010 820-021
Bi-LED, left-side traffic, ECE	1LL 010 820-031



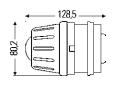


#### **BI-HALOGEN**

Halogen low and high beam in one lamp unit

Right-side traffic, H7, ECE	1AL 009 998-001
Left-side traffic, H7, ECE	1LL 009 998-011
Right-side traffic, H9, SAE	1AL 009 998-021



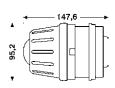


#### 50mm PREMIUM MODULE - LOW BEAM

Integrated headlamp with frame for 3-point attachment, adjustable from the front and rear

Right-side traffic, H7, ECE	1BL 009 071-001
Left-side traffic, H7, ECE	1ML 009 071-011
Right-side traffic, H7, SAE	1BL 009 071-081





#### 50mm PREMIUM MODULE - HIGH BEAM

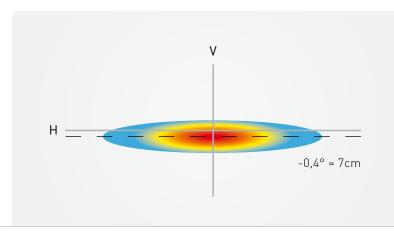
Integrated headlamp with H9 bulb frame for 3-point attachment, adjustable from the front and rear

High beam headlamp, ECE/SAE	1KL 009 486-001
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# Adjustment of Headlamps

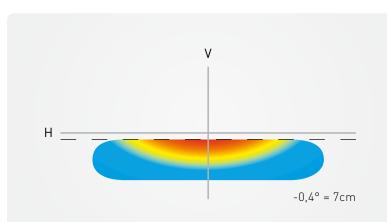
#### 1. High beam USA

Maximum light-output in HVmax is at HV -0,4°. 7cm below the horizontal 0-line at a distance of 10m.



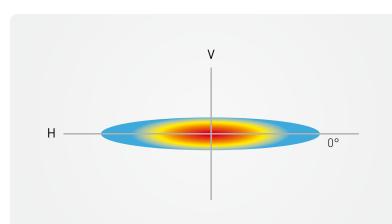
#### 2. Low beam USA

The cutoff-line is at HV-0,4°. 7cm below the horizontal 0-line at a distance of 10m.



#### 3. High beam ECE:

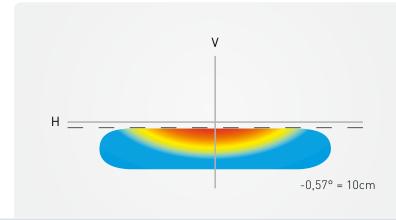
Maximum light-output in HVmax is at HV 0°. No inclination of the light-output allowed at 10m distance.



#### 4. Low beam ECE:

The cutoff-line is at HV-0,57°.

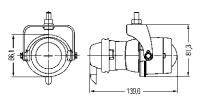
10cm below the horizontal 0-line at a distance of 10m.











Version with rotateable bracket

#### MICRO DE PREMIUM MODULE

With H3 bulb, aluminium design finisher

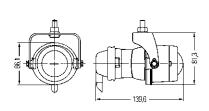
Fog lamp with rotateable bracket, ECE/SAE

1NL 008 090-301

Fog lamp with 3-point holder, ECE/SAE

1NL 008 090-311





#### MICRO DE

With H3 bulb, black decorative ring

Fog lamp, ECE/SAE **1NL 008 090-031** 

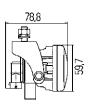




**CUSTOMIZED FOG LAMP** 







#### FF40

With H8 bulb and sheet metal reflector, plastic housing with glass lens

Fog lamp, ECE/SAE

1NA 010 047-111







#### MODULE 60

With H8 bulb and reflector made of aluminium cast

Fog lamp, SAE

1NL 998 570-341

ECE approval on request







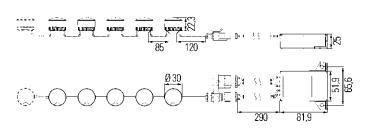








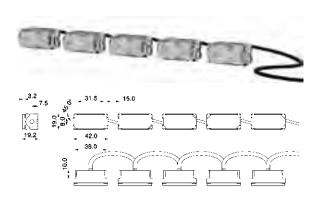




#### LED DAYTIME RUNNING LIGHT SET LEDayFLEX

Set consists of pre-wired module chains with five to eight round light modules as well as an electronic box for controlling the daytime running light. The system is connected to the vehicle's electrical system via a 3-pin AMP supersealed connector. 12 / 24 V multi-voltage

5 LED light modules	2PT 010 458-001
5 LED light modules with position light	2PT 010 458-011
6 LED light modules	2PT 010 458-021
6 LED light modules with position light	2PT 010 458-031
7 LED light modules	2PT 010 458-041
7 LED light modules with position light	2PT 010 458-051
8 LED light modules	2PT 010 458-061
8 LED light modules with position light	2PT 010 458-071





#### LED DAYTIME RUNNING LIGHT SET LEDayFLEX II

LEDayFlex II has expanded the system of flexibly connected module chains since 2012. The rectangular LED daytime running light chains with five or six pre-wired light modules make new designs possible.

5 LED light modules with position light	2PT 980 789-051
6 LED light modules with position light	2PT 980 789-061







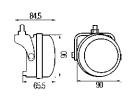












#### LED DAYTIME RUNNING LIGHT SET, ROUND DESIGN

2 lights including harness, universal bracket, 3 high-performance LEDs per light, multi-voltage 9-33 V 12 V/5.5 W, current consumption = approx. 2.18 A

Set for surface-mounting

2PT 009 599-811







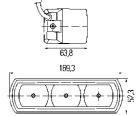












#### LED DAYTIME RUNNING LIGHT SET, RECTANGULAR DESIGN

2 lights including harness, universal bracket, 3 high-performance LEDs per light, multi-voltage 9-33 V 12 V/5.5 W, current consumption = approx. 2.18 A, daytime running light with with position light

Set for surface-mounting	2PT 009 496-801
Individual light without bracket, DRL with PO function	2PT 009 496-007





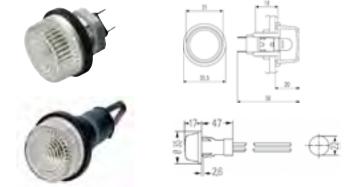


#### **SERIES 8562**

For flush-mounting

#### Non sealed system

Transparent lens, T4W bulb	2PF 998 562-007
Grey smoked lens, T4W bulb	2PF 998 562-017
Sealed system	



SERIES 3563	
For flush-mounting with W5W bulb	
With 2-pin connector	2PF 003 563-177
With cable 1800mm	2PF 033 563-151







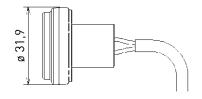












#### **SERIES 0825**

For flush-mounting, clear lens, black plastic housing with adhesive film for sticking to the body. 2-pin cable, open cable ends, with 2 white LEDs, mounting hole = 18.5mm, 12 V / 0.6 W, current consumption = approx. 0.05 A

With 150mm cable

2PF 340 825-041





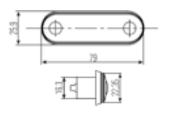












#### **SERIES 9590**

For horizontal or vertical flush-mounting, 12 V/0.5 W, current consumption = approx. 0.04 A

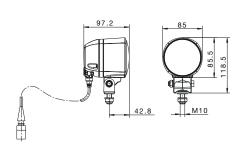
With 500mm cable

2PF 959 590-401

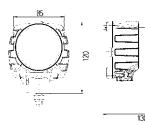












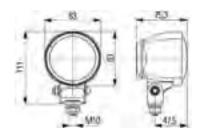
#### **MODULE 70 X-POWERPACK XENON**

Impact-proof fibreglass reinforced plastic housing, ballast electronics in aluminium housing, stainless steel mount, IP 6K9K (pressure cleaner-proof), light colour: 4.150° Kelvin

#### With integrated ballast

Glass lens, D1S, 12 V / 35 W	1G0 996 276-131
With external ballast	
Glass lens, D1S, 12 V / 35 W	1G0 996 276-361



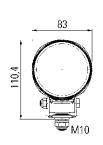


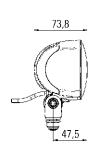
#### **MODULE 70 HALOGEN**

Impact-proof fibreglass reinforced plastic housing and clear glass lens, IP 5K9K (pressure cleaner-proof).

Grommet, H3 (excl. bulb)	1G0 996 176-011
H9 connector, incl. H9 bulb, 12 V/65W	1G0 996 176-051
GE886 connector, incl. GE886 bulb, 12 V/50 W	1G0 996 176-081
GE862 connector, incl. GE862 bulb, 12 V/38 W	1G0 996 276-111





















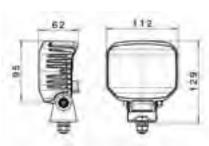
#### **MODULE 70 LED**

Premium aluminium housing, light output: 800 Lumen, reverse polarity protection, overvoltage protection, overheating protection, 6K9K/IP 67 (pressure cleaner-proof/immersible), E1 approved, light colour: 5.700° Kelvin

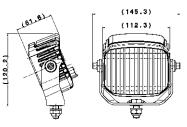
Glass lens, 2.000mm cable, 9-33V/13W

1G0 996 276-701









Heavy Duty



#### **POWER BEAM 1500 LED**

Premium aluminium housing, light output: 1.300 Lumen, reverse polarity protection, overvoltage protection, overheating protection, 6K9K/IP 67 (pressure cleaner-proof/immersible), E1 approved, light colour: 5.700° Kelvin, suitable for heavy duty use

Plastic lens, 9-33V/22 W	1GA 996 288-001
Plastic lens, 9-33V/22 W, Heavy Duty	1GA 996 288-021



# SIGNAL LIGHTING



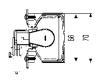




PS 8585	
Stop-taillight function	
With 21/5W bulb, ECE/SAE	2SB 998 585-007







79,3

60mm PREMIUM LIGHTS	
With 21/5W bulb, taillight, ECE	2SA 009 001-041
With 21W bulb, stoplight, ECE	2DA 009 001-051
With 21/5W bulb, stop- taillight, ECE	2SB 009 001-061
With 21W bulb, rear flasher, ECE	2BA 009 001-001
With 21W bulb, rear fog light, ECE/SAE	2NE 009 001-021
With 21W bulb, back-up light, ECE/SAE	2ZR 009 001-011





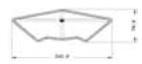












#### PS 8578

Stop-taillight function with rear reflex

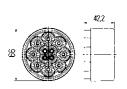
#### Bulb versions 21/5W

With plate light function and cable 175mm, ECE	2SU 998 578-017
With cable 175mm, ECE/SAE	2TA 998 578-037

#### LED version

With cable 1500mm, ECE/SAE	2TA 998 578-047
With capte 1000mm, E0E, on the	217,700,000



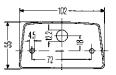




LED 60mm PREMIUM LIGHTS	
Stop- taillight, ECE/SAE	2SB 009 001-401
Rear flasher, ECE	2BA 009 001-411

# LICENSE PLATE LAMPS







#### **SERIES 8523**

For R10W bulb

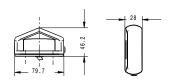
Surface mounting, heavy duty, ECE/SAE

Surface mounting, standard, ECE/SAE

2KA 998 523-001

2KA 998 523-131





#### **SERIES 8567**

With C5W bulb

Surface mounting, ECE/SAE **2KA 998 567-007** 



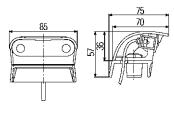














#### **SERIES 9640**

For license plates 520 x 120mm, with 2500mm cable, bracket for mounting the light to the body, cover, fastening screws, cover caps for screws as well as a spacer for different mounting situations, multivoltage 10-33 V; with 2 LEDs 0.5 W, 12 V / 0.55 W, current consumption = approx. 0.04 A

Surface mounting, ECE	2KA 959 640-601
Flush mounting, ECE	2KA 959 640-102









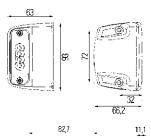














#### **SERIES 0278**

With 4 LEDs, clear lens, housing made of black plastic, with flat plug  $6.3 \times 0.8$ , 12 V/1 W, current consumption = approx. 0.08 A

Surface mounting for 520 x 120mm license plates, ECE	2KA 010 278-321
Surface mounting for 340 x 240 and 280 x 200mm license plates, ECE	2KA 010 278-421
Flush mounting for 520 x 120mm license plates, ECEs	2KA 010 278-311



# K-LED 2.0 BEACON

The products on this page have the following features:























#### TYPES OF WARNING SIGNAL

First HELLA beacons where you can choose from rotating or flashing warning signals.

#### **BRIGHTNESS LEVELS**

The integrated light sensor automatically toggles between day and night mode. This guarantees the best possible warning effectiveness.

#### **FUNCTIONAL SAFETY**

First HELLA beacons to meet the requirements of IP 67.

#### **VIBRATION RESISTANCE**

Without any moving parts, the beacon is protected from strong vibrations and shocks.

#### **COMPACT DESIGN**

Extremely flat design and impactresistant beacon dome.

TECHNICAL SPECIFICATIONS	
Operating voltage	10 – 32 V
Total current consumption	0.45 A to 2.5 A
Power consumption	max. 30 W
Protection category	IP 67

K-LED 2.0 F BEACON FIXED ATTACHMENT	<b>-</b>
Multi-voltage, amber	2XD 011 557-101
Multi-voltage, blue	2XD 011 557-111
Multi-voltage, red	2XD 011 557-121

PIPE-SUCKET ATTACHMENT	
Multi-voltage, amber	2XD 011 557-201
Multi-voltage, blue	2XD 011 557-211
Multi-voltage, red	2XD 011 557-221

K-LED 2.0 R BEACON -

MAGNETIC ATTACHMENT	
Multi-voltage, amber 2XD 011 557-301	
Multi-voltage, blue	2XD 011 557-311
Multi-voltage, red	2XD 011 557-321

K-LED 2.0 M BEACON -

# KL ROTA COMPACT BEACON

The products on this page have the following features:













KL ROTA COMPACT F BEACON - FIXED ATTACHMENT

12 V, amber 2RL 009 506-201



KL ROTA COMPACT FL BEACON - PIPE-SOCKET ATTACHMENT

12 V, amber 2RL 009 506-001



KL ROTA COMPACT M BEACON - MAGNETIC ATTACHMENT

12 V, amber 2RL 009 506-301

#### TECHNICAL SPECIFICATIONS

Operating voltage	10.8 – 13.8 V
Total current consumption	5A
Rotation Speed	180 rpm
Power consumption	55 W
Protection category	IP 5K4K, IP X9K (resistant to dust and high-pressure jet cleaners)

#### COMPACT BEACON FOR TOUGH APPLICATIONS.

- Especially impact-resistant
- Low-noise belt drive

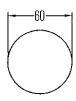
#### ROTA COMPACT FL:

- Elastic, impact-absorbing base minimises the danger of damage; the light always returns to the optimum position (maximum inclination: 90°)
- At the same time, the elastic base serves as a vibration damper



# **REFLECTORS**





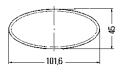
REFLECTORS ROUND 60MM	
Self-adhesive, red	8RA 002 014-081
Self-adhesive, amber	8RA 002 014-101
Self-adhesive, white	8RA 002 014-091





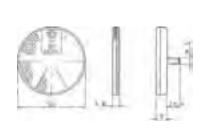
REFLECTORS RECTANGULAR	
For horizontal or vertical surface-mounting	
Self-adhesive, red	8RA 003 326-031
Self-adhesive, amber	8RA 003 326-041
Self-adhesive, white	8RA 003 326-051





REFLECTORS OVAL	
For horizontal or vertical surface-mounting	
Self-adhesive, red	8RA 343 160-007
Self-adhesive, amber	8RA 343 160-027
Self-adhesive, white	8RA 343 160-017





REFLECTORS ROUND 55MM	
Self-adhesive, red	8RA 342 006-100
Self-adhesive, amber	8RA 342 006-200
Self-adhesive, white	8RA 342 006-300
Mounting with M5 nut, red	8RA 342 006-110
Mounting with M5 nut, amber	8RA 342 006-210
Mounting with M5 nut, white	8RA 342 006-310

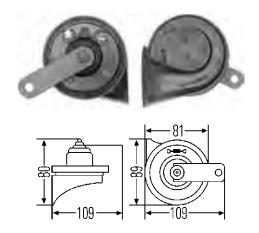
# **HORNS**



HORN S80 LOW TONE	
Frequency	360±20 Hz
Sound Pressure Level at 2m distance	105-118 dB
Colour	Black
Part number	3AL 992 300-401



HORN S80 HIGH TONE	
Frequency	440±20 Hz
Sound Pressure Level at 2m distance	105-118 dB
Colour Black	
Part number	3AL 992 300-411



TRUMPET HORN	
Frequency	400±20 Hz
Sound Pressure Level at 2m distance	115 dB
Colour	Black
Part number	3FG 940 800-177



# **ANGULAR POSITION SENSORS**

Single and double sensors





- Level measurement
- Active adaptive suspension control

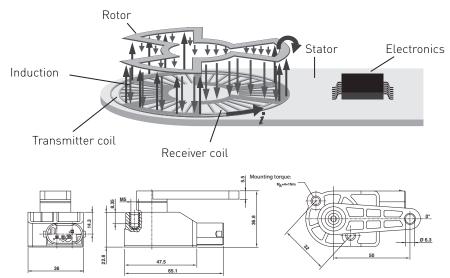


#### **APPLICATION**

The CIPOS®-type angular position sensors (contactless inductive position sensors) are designed for many different applications to measure angles accurately and reliably even in tough environments.

#### PRODUCT CHARACTERISTICS

- Single or double sensors
- Double sensors for security relevant applications
- High precision due to internal
   14 bit resolution
- High thermal stability and linearity
- High degree of insensitivity to magnetic fields
- Zero position individually programmable
- Various connection elements available



SINGLE SENSORS	
LEVER ARM	50mm
ANGLE RANGE	-54° to +54°
PART NUMBER	6PM 008 161-151

DOUBLE SENSOR (security relevant)	
LEVER ARM	50mm
ANGLE RANGE	-54° to +54°
PART NUMBER	6PD 009 583-011

SENSORS AVAILABLE ALSO WITH LEVER ARM: 70mm ANGLE RANGE: -30° to +30°

# **ELECTROMOTIVE ACTUATORS**

#### Electrical locking/unlocking & closing

#### PRODUCT CHARACTERISTICS

- High actuating force
- Laser-welded housing
- Three versions
- Dust- and waterproof
- With or without manual adjustment
- Thermal overload protection via PTC (PolySwitch)
- Multifunctional
- Various connection elements available

#### **APPLICATION**

Electrical opening and closing of flaps on all kinds of doors, flaps, glove compartments, covers etc.

#### Space-saving with micro-switch

- Locking for helmet storage
- No need for second lock



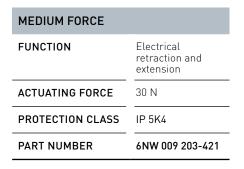


LOW FORCE	
FUNCTION	Forward and reverse rotation electrical
PROTECTION CLASS	IP 5K4
PART NUMBER	6NW 011 122-011



MEDIUM FORCE	
FUNCTION	Electrical retraction and extension
ACTUATING FORCE	30 N
PROTECTION CLASS	IP 5K0
PART NUMBER	6NW 009 203-401







PART NUMBER	6NW 009 424-791
PROTECTION CLASS	IP 5K0
ACTUATING FORCE	200 N
FUNCTION	Electrical retraction and extension
HIGH FORCE	



**INTELLIGENT BATTERY SENSOR (IBS)** 

**Energy management** 

#### PRODUCT CHARACTERISTICS

- Accurate measurement of battery voltage, current and temperature parameters
- Determination of the battery state of charge (SOC), state of health (SOH) and state of function (SOF) condition parameters
- Simple electrical and mechanical integration



#### **APPLICATION**

The IBS is mounted at the negative pole of the battery via the pole terminal, and thus integrated directly into the vehicle electrical system

OPERATING VOLTAGE	PART NUMBER
6 V to 16.5 V	6PK 010 842-001





### **IBS CONTROL**

**Energy management** 

#### PRODUCT CHARACTERISTICS

• Easy to assemble thanks to plug & play design

#### **APPLICATION**

IBScontrol is a stand-alone version of the intelligent battery sensor. It primarily consists of the Intelligent Battery Sensor and colour display components and is used to permanently monitor the starter or consumer battery in the vehicle.

DESCRIPTION	PART NUMBER
Surface-mounted version	6PY 178 103-811
Flush-mounted version	6PY 178 103-831



#### **DESIGN AND FUNCTION**

- 1 Remaining running time Indicates the remaining running time with current consumption value
- 2 Current indicator Red = discharging Green = charging
- 3 Current as numerical value Example: Current drain 0.1 A
- Battery ageing (SOH = State of health) Example: The original battery capacity is already reduced by 2 %
- (SOC = State of Charge)
  Current state of charge of the battery
  Example: State of charge 88 %

# LEVEL SENSORS

Measurement of fluid levels (static and dynamic)

#### PRODUCT CHARACTERISTICS

- Continuous measurement of the engine oil level in the static and dynamic range
- Compact sensor architecture with one multi-chip module
- Integrated temperature sensor
- Immediate measurement after switch-on

#### **APPLICATION**

In vehicles oil sensors ensure that the engine does not work with too less oil unnoticed. The tried and tested technology of ultrasonic sensors works on the propagation time principle and records the filling level continuously when the vehicle is being driven. When the engine is running (dynamic measuring range), the filling level is significantly lower than the filling level when the engine is at a standstill (static measuring range).



LEVEL SENSOR	
SUPPLY VOLTAGE	12 V
MEASUREMENT RANGE	static 129mm, dynamic 96mm
PART NUMBER	6PR 009 622-051



Recording of fluid levels (static and dynamic)

LEVEL SWITCH



This level switch is used to monitor levels. The main application is monitoring engine oil levels and guaranteeing a minimum filling quantity in the static range (engine at a standstill) or in the dynamic range (engine in operation) in various vehicle engines.



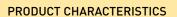
#### PRODUCT CHARACTERISTICS

- Compact sensor design
- Installation in oil pan
- Simple electrical connection
- Principle use for engine oil
- Application in other media possible





The new waterproof series of module switches for electrical systems. Meets the requirements of IP 68. The lasered symbols are lit by integrated LEDs.



- IP 68 compilant with test standard IEC EN 60529
- Highly reliable even under extreme conditions
- The widest possible range of switch functions
  - NO contacts/three-way switches
  - momentary-contact and maintainedcontact switches
  - locking functions
  - hazard light switches
- Manifold standard and customerspecific laser symblos
- Specific symbol illumination by using one or two LED light sources
- Easy to mount, either directly in the mounting hole or using a modular mounting frame
- Warning light in the same design for safety-related feedback



TECHNICAL DETAILS	
Mounting hole	21.1 mm x 37.0 mm
Rocker material	PC transparent, painted
Connecting contacts	6.3 mm x 0.8 mm
Coating of switch contacts	CuZn silver-plated
Light source	Up to two LEDs, one orientation light, green 1x function lighting, red Warning lights available in amber and green
Service life	150,000 switching cycles
Sealing	IP 68, IP 66 terminal side
Operating temerature	-40°C to +85°C
Dashboard thickness	For directly installed switches, 2 mm



#### Overvoltage protection

Supplement to the electronics for protecting the LED against high voltage/current in the vehicle's electric system as per ISO 7637-2.



#### IP protection class

International Protection (IP) as per DIN 40050 Part 9.

Specific definition for road vehicles.

5K = Dust protected

6K = Dust tight

9K = Protection against water during pressure / steam cleaning.



#### Polarity reversal protection

Even if the connecting cable is connected the wrong way round, there is still no danger for the electronics.



#### **Direction Indicator failure check** as per ECE R 48

The driver must be informed of a failure of the direction indicator function on the vehicle. To remain legally compliant, this requirement must also be fulfilled for LED lights. This requirement is fulfilled by means of an integrated selfdiagnostic unit on the LED PCB and an electrical pulse. HELLA has implemented failure control has been implemented as an impulse since 2011: ISO Standard ISO 13207.



#### Bi-polarity of the light

Even if the connecting cable is attached with reverse polarity, the LED functions fully.



#### Approval for transport of dangerous goods

Lamp approved for transport of dangerous goods according to Hazardous Waste Road Directive (GGVS).



#### **Electronic circuit**

Basically, two different circuits are possible for LED lamps:



Active: LED current regulation by means of active electronics

Passive: Setting a specific voltage range for the LED by means of a series resistor.





#### Electromagnetic compatibility

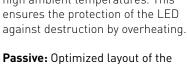
Electromagnetic compatibility (EMC) tested and EU type approval issued.



#### Thermal Management

distribution and spread.

Active: Electronic power control of the LED in case of impermissibly high ambient temperatures. This



components for even temperature



EMC 5

#### **Automotive Electronic Council**

Components qualified according to automotive standard.



#### **ECE R 65**

Defies the lighting values, light distribution and colour location of beacons.



#### Vehicle electrical system voltage

Defines the power supply for the lamp. This can be 12 V, 24 V or a flexible voltage range for Multivolt (8 - 33 V).



#### Beacons - failure control (DIN 14630 - blue)

Beacons for preferential road use.



